Abundance Estimation and Assessment of Pacific Marine Turtles

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Review of NOAA Fisheries' Science on Marine Mammals & Turtles
Southwest and Northwest Fisheries Science Centers
27-31 July 2015
La Jolla, CA

Five sea turtle species in the eastern Pacific Ocean

Leatherback (E)

Loggerhead (E)

Green turtle (E*)

Hawksbill (E)

Olive Ridley (T)

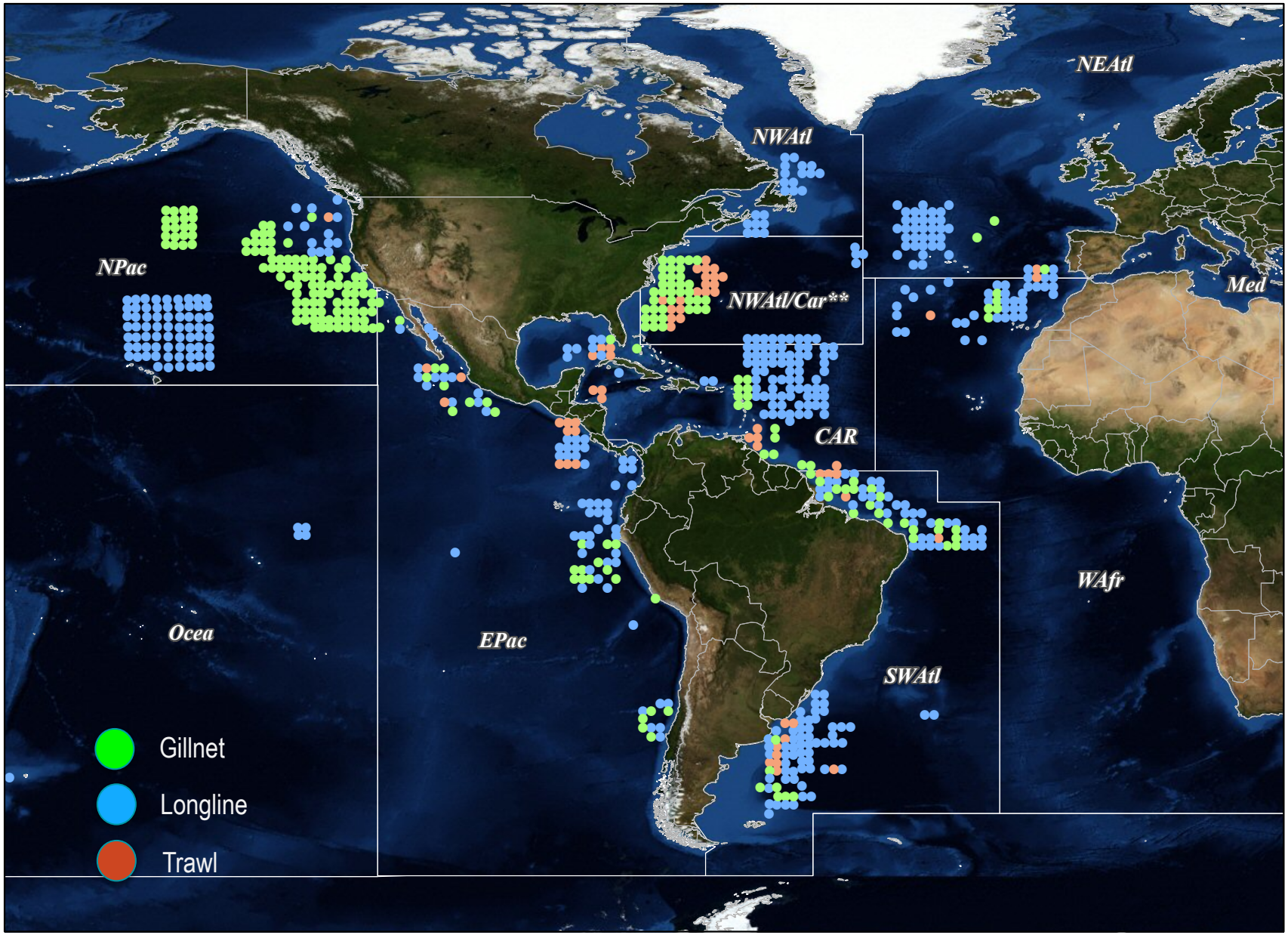
Threats at nesting beaches

habitat loss

killing of adults

egg harvest

Turtle bycatch in marine fisheries



Wallace et al. 2010. Cons. Lett.

Decades of human impacts = declining trends throughout the Pacific

East Pacific green turtle

RECOVERY

Goal: The recovery goal is to delist this regionally important population.
Recovery Criteria: To consider de-listing, all 8 recovery criteria must be met

2) Each stock must average 5,000 females nesting annually over six years

3) Nesting populations are either stable or increasing over a 25-year monitoring period.

5) Foraging populations are exhibiting statistically significant increases at several key foraging grounds within each stock region.

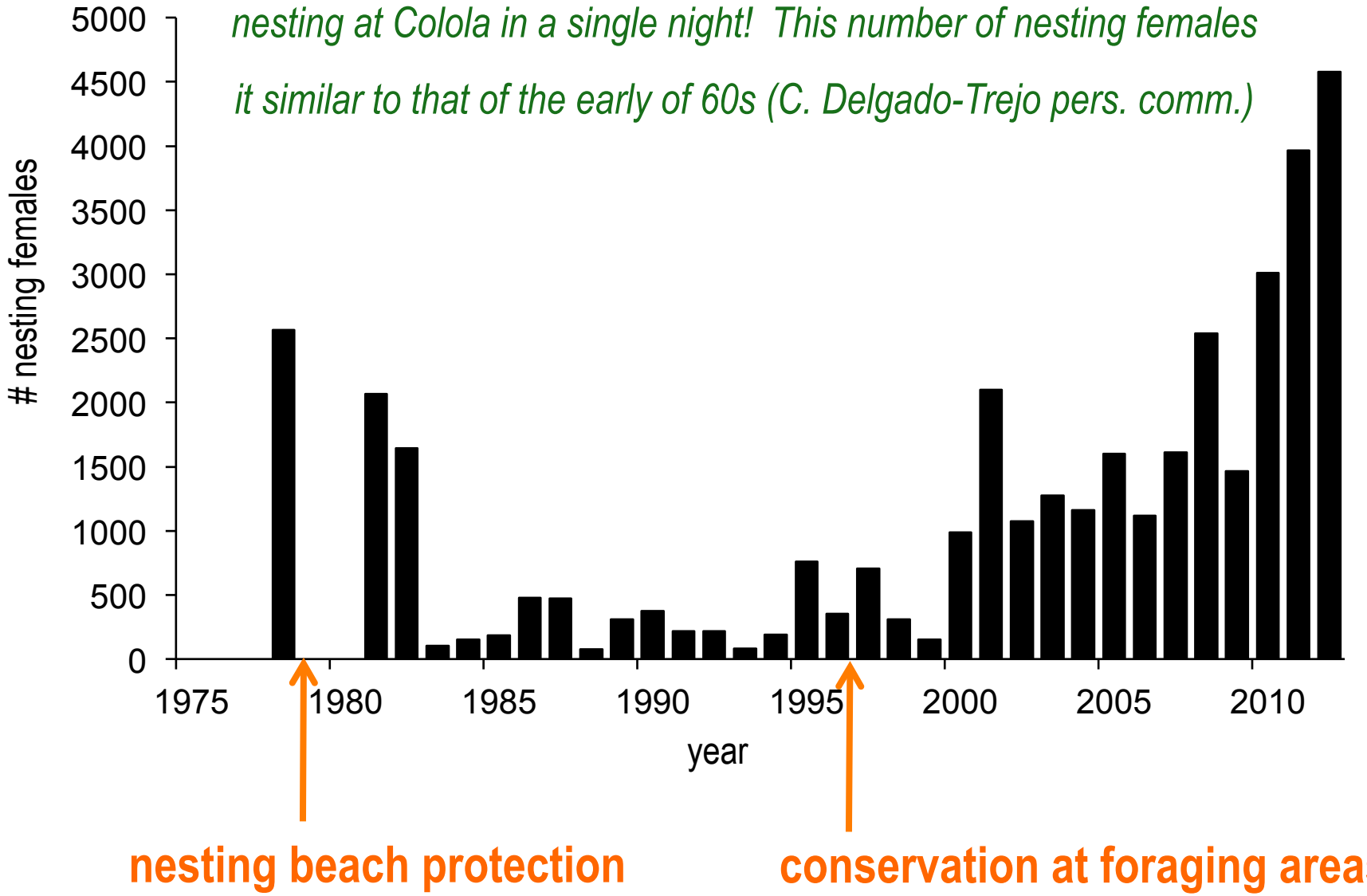
8) International agreements are in place to protect shared stocks.

RECOVERY

Regular population assessments are necessary to measure progress toward sea turtle recovery goals under the ESA and to provide the foundation for evaluating management activities

With EP green turtles, recovery efforts have produced encouraging results

On 14 September 2014 more than 1000 female green turtles nesting at Colola in a single night! This number of nesting females it similar to that of the early of 60s (C. Delgado-Trejo pers. comm.)



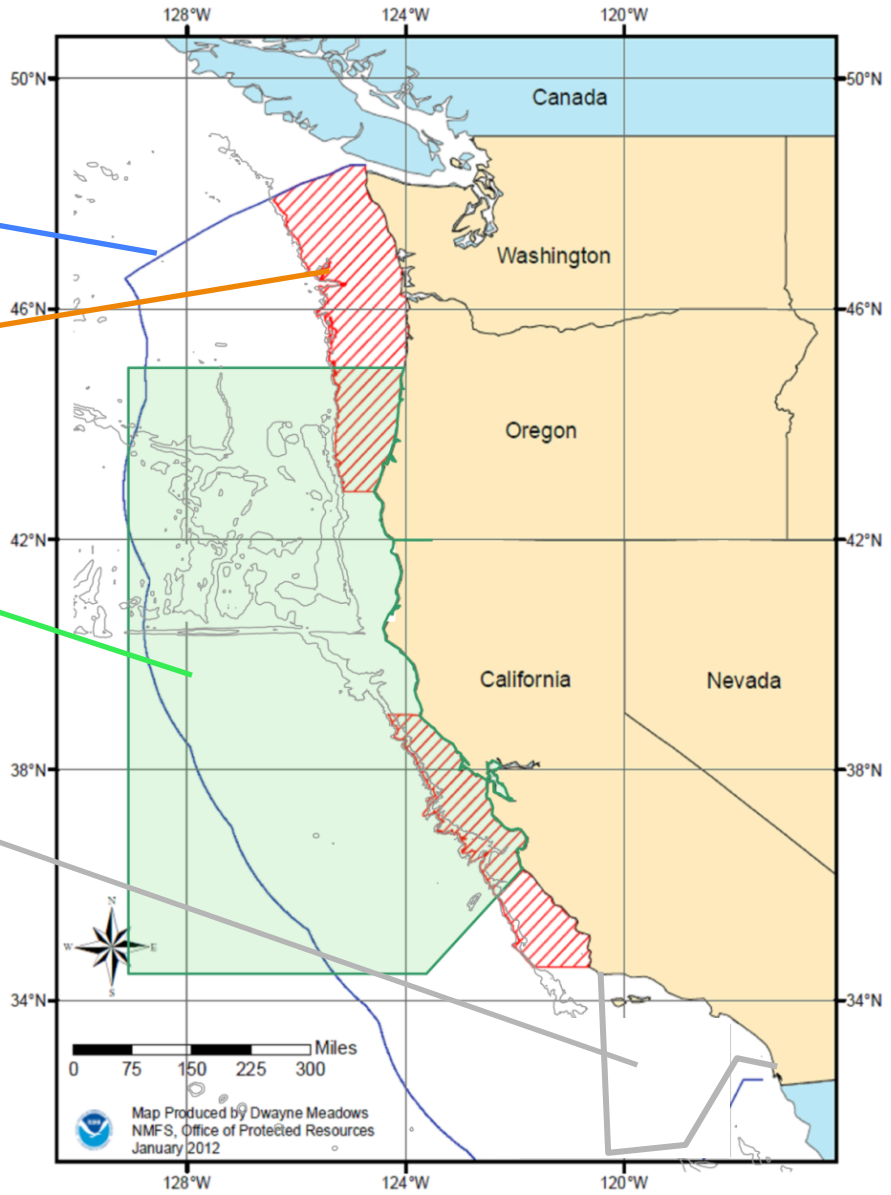
US West Coast sea turtle conservation areas

West Coast EEZ

Leatherback critical habitat

Leatherback closure area
(15 Aug-15 Nov)

Loggerhead closure area
(ENSO trigger)



Links with Mandates, Needs of Regulatory Partners

Mandate	*Management Needs*
Endangered Species Act	5-Year Biological Reviews Critical Habitat Designation Demographic data Life-history data
Sea Turtle Recovery Plans	Biological data, bycatch reduction
Magnuson-Stevens Act	Build science capacity with int. partners Bycatch reduction technology Demographic data and bycatch levels
U.S. West Coast fisheries	Scientific advice (WCRO, NWFSC, PFMC)
San Diego Bay management	Demographic and habitat use data (Unified Port of SD, Navy)
Inter-American Convention	Scientific oversight and advice for COP Build science capacity with int. partners

Stock Assessment Improvement Plan

NMFS 2004

Tier I - Improve Stock Assessments Using Existing Data Collection Resources

This tier maintains the status quo with no new assessment efforts.

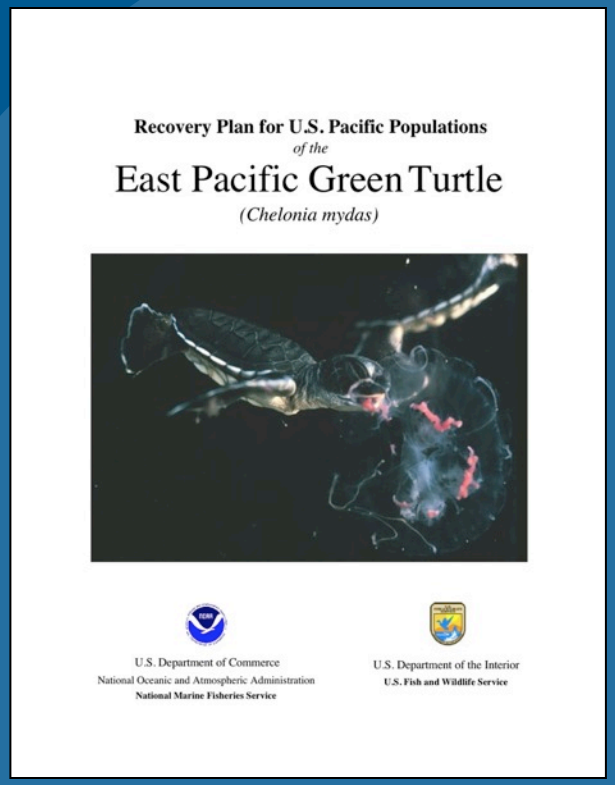
Tier II - Elevate Stock Assessments to New National Standards of Excellence:

At this Tier the quality of all sea turtle stock assessments should achieve a level commensurate with ESA mandates (life-history, abundance, etc).

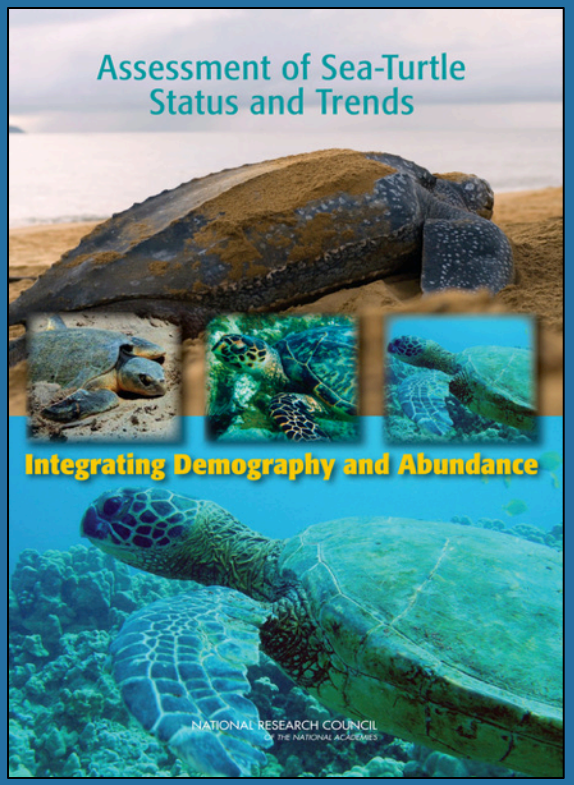
Tier III - Next Generation Assessments

Collection of detailed data on ecology, habitat, behavior, and health of "Ecosystem Indicator Species" to provide a better understanding of how marine turtles function within their respective ecosystems

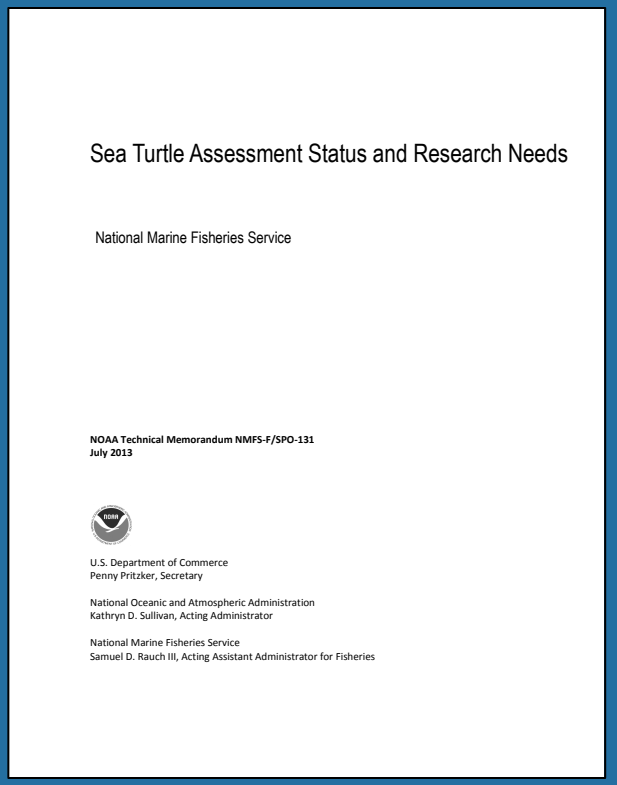
Blueprints for research and assessment of U.S. Pacific sea turtle populations



Recovery Plans (1998)

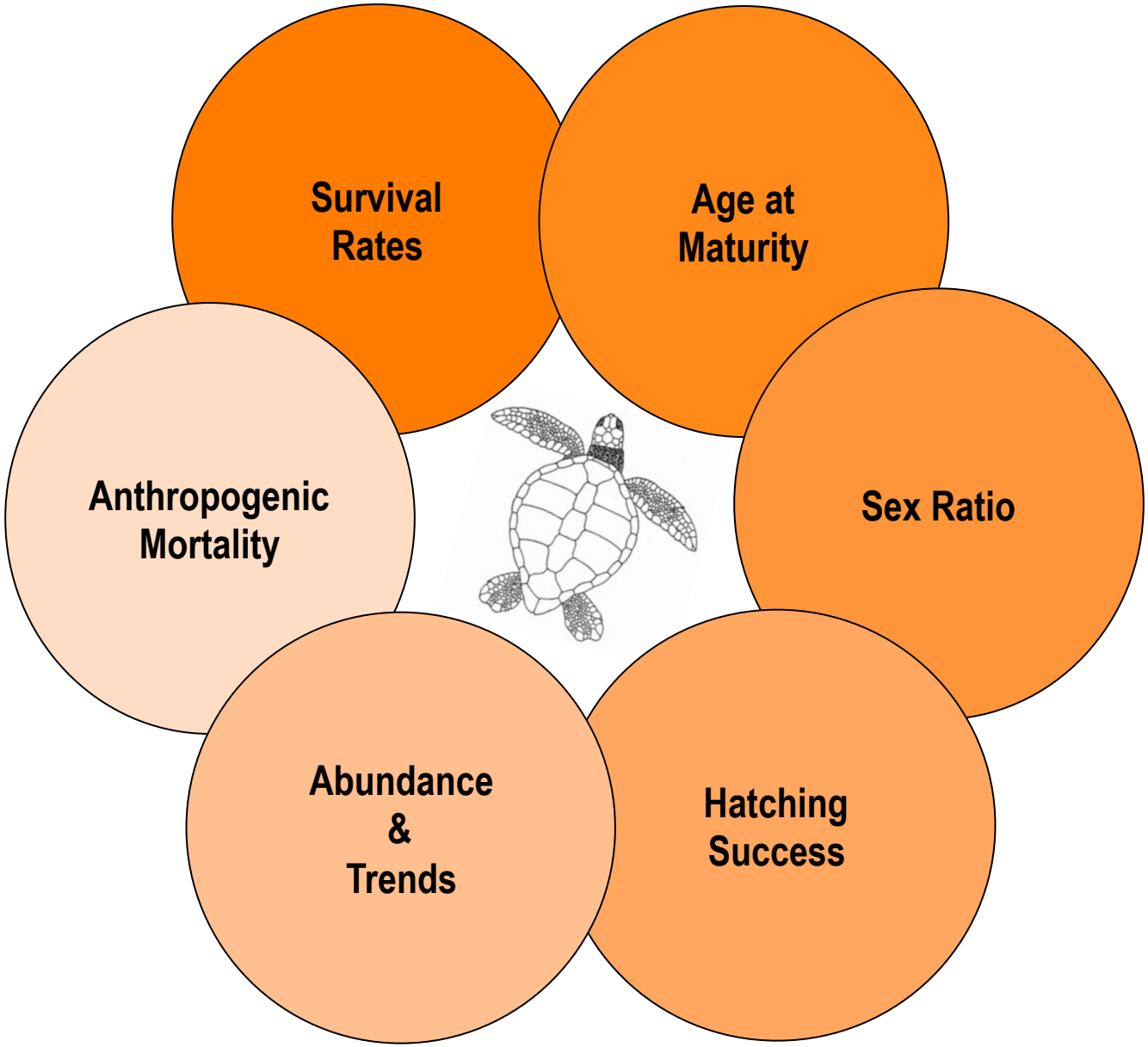


NRC Report (2010)



Turtle SAIP Report (2013)

Our assessment research focuses on core elements of turtle demography

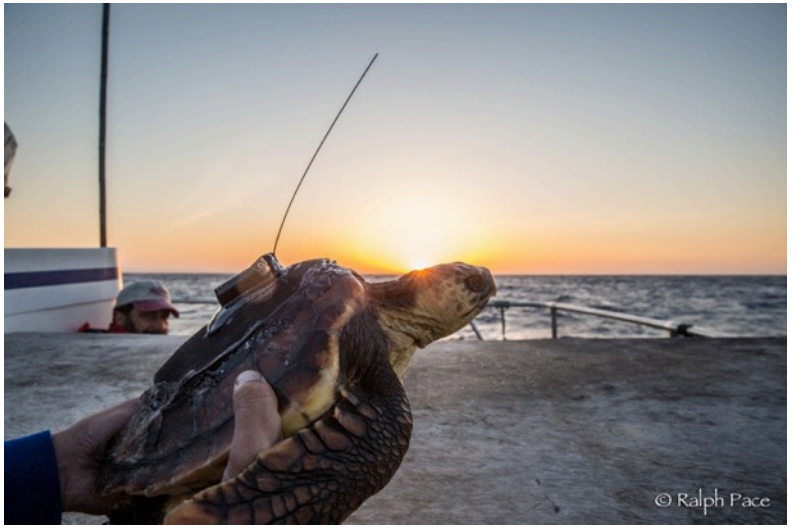


Data collection methods

nesting beach monitoring

aerial surveys / line-transect analysis

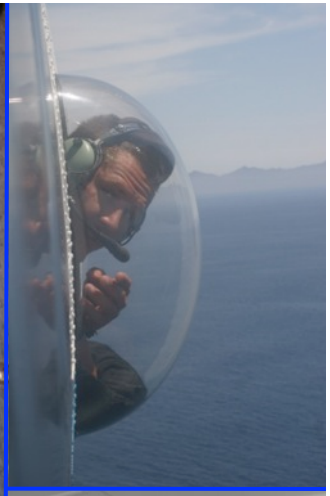
in-water surveys / capture-mark-recapture

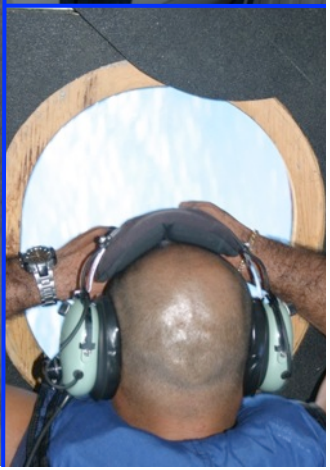


biotelemetry / calibrate line-transect results

NOAA Twin Otter Aircraft

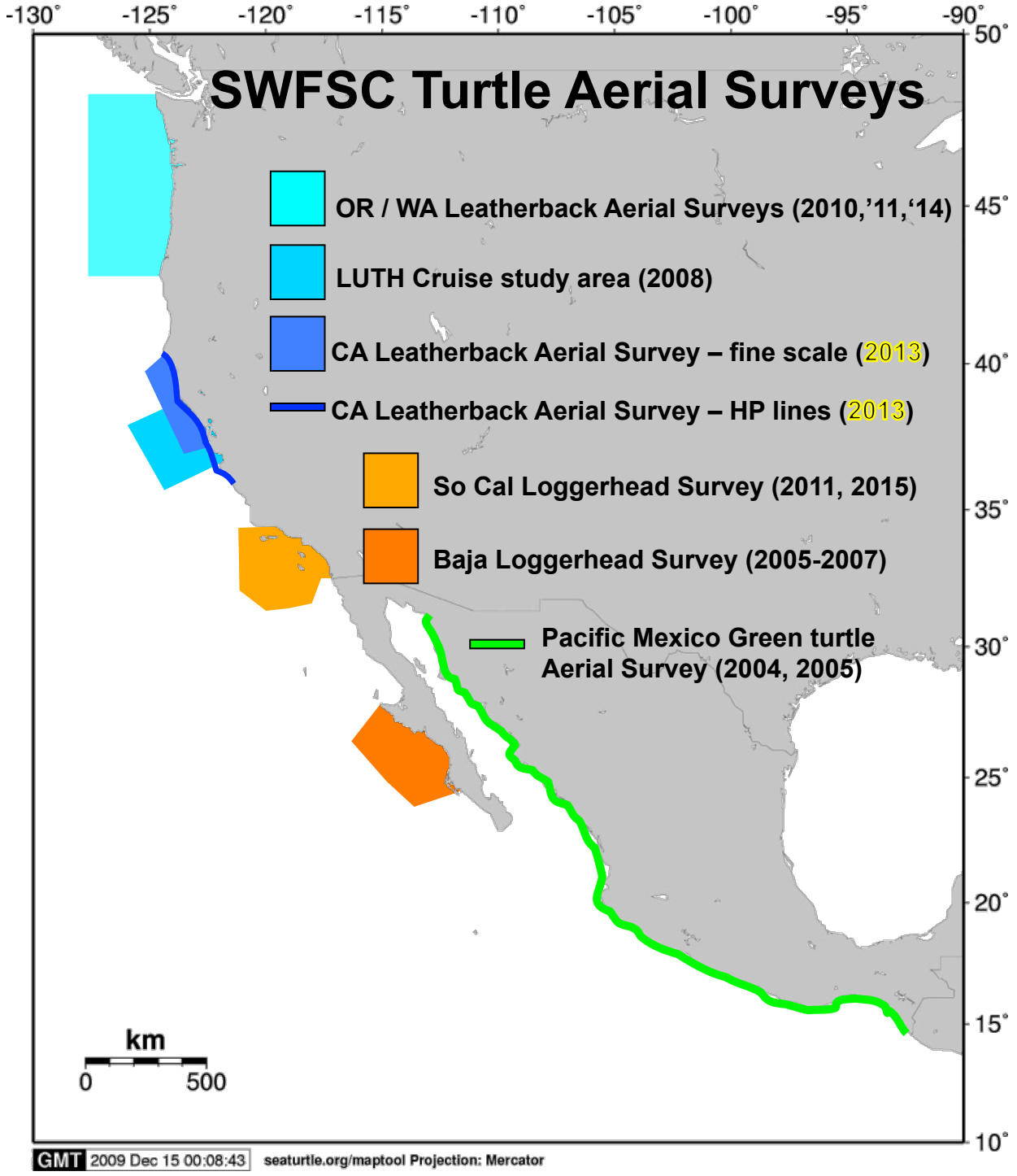
2 pilots
1 data recorder
1 belly window observer
2 side bubble window observers
1 person on break





NOAA Twin Otter

Partenavia Observer (Aspen Helicopters)

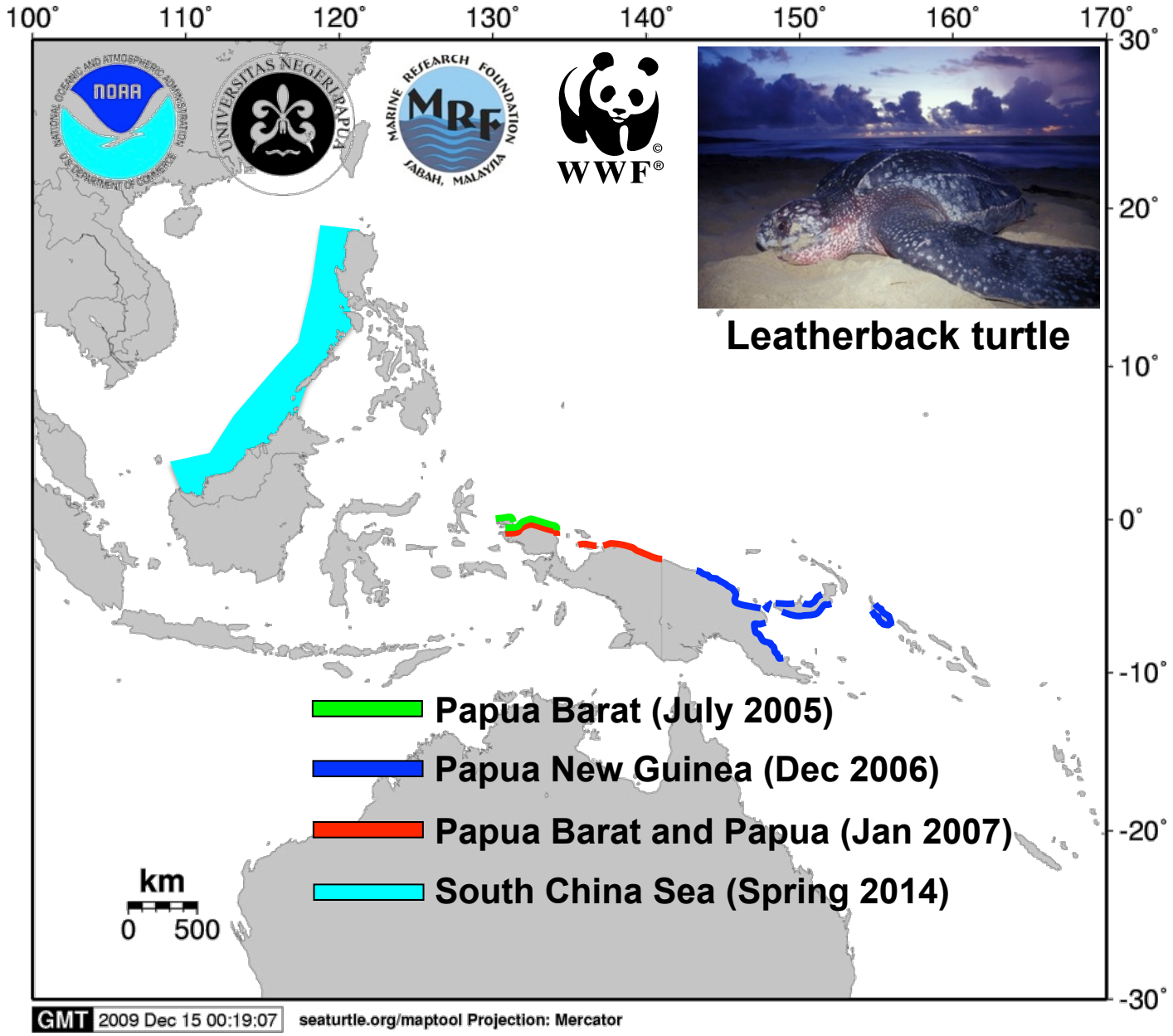


Time at depth data is a fundamental requirement for estimating sea turtle abundance via aerial surveys

Shaded area corresponds with time of aerial surveys

Peckham, Eguchi, et al.,

SWFSC Turtle Aerial Surveys – Western Pacific



Major field efforts for turtle assessment

ANNUAL

Southern California green turtle capture-mark-recapture
June-December

St. Croix leatherback turtle life history
May-August

Western Pacific leatherback nesting beach monitoring & capacity building
June-July

ROTATIONAL

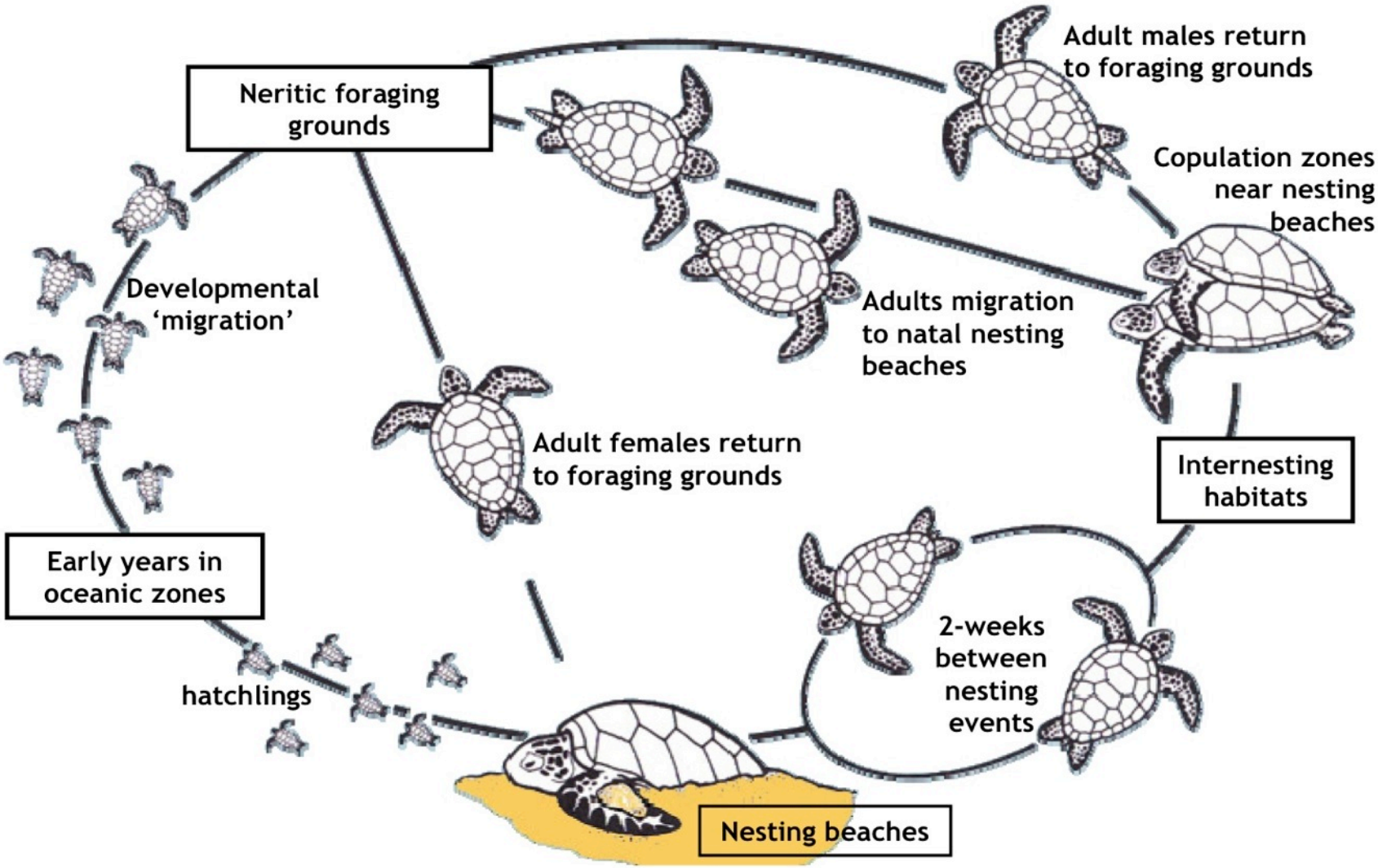
Central California leatherback aerial survey
September-October (used to be annual, now every 3 yrs; next survey in Fall 2016)

OR/WA leatherback aerial survey
September-October (every 3 yrs; next survey in Fall 2017)

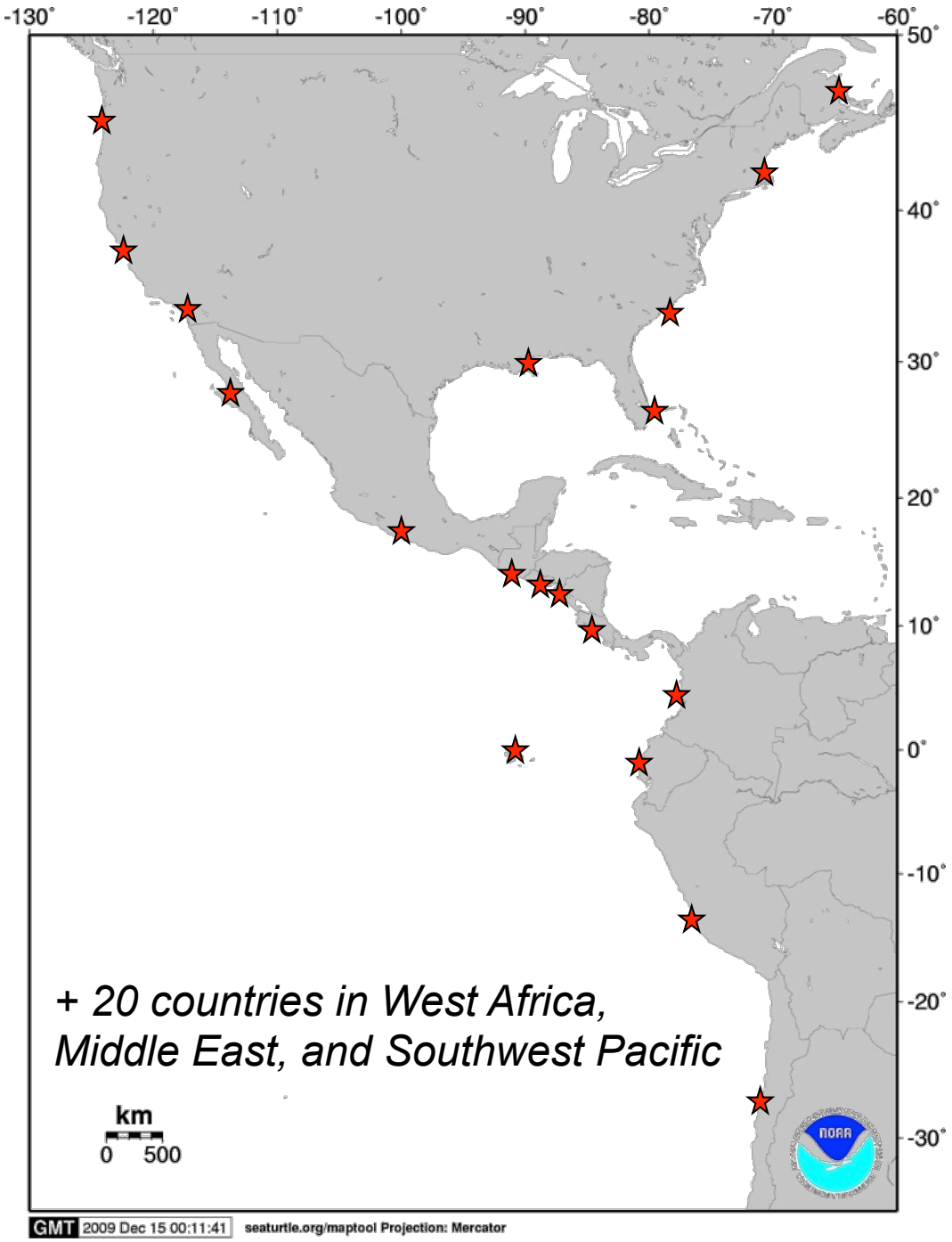
Loggerhead turtle research cruise in the southern California bight.
Late summer/fall (ENSO years; 1st cruise in April 2015, next survey in Fall 2015)

Eastern Pacific hawksbill nesting beach monitoring & capacity building
El Salvador, Nicaragua & Panama (suspended in 2014 due to lack of funds)

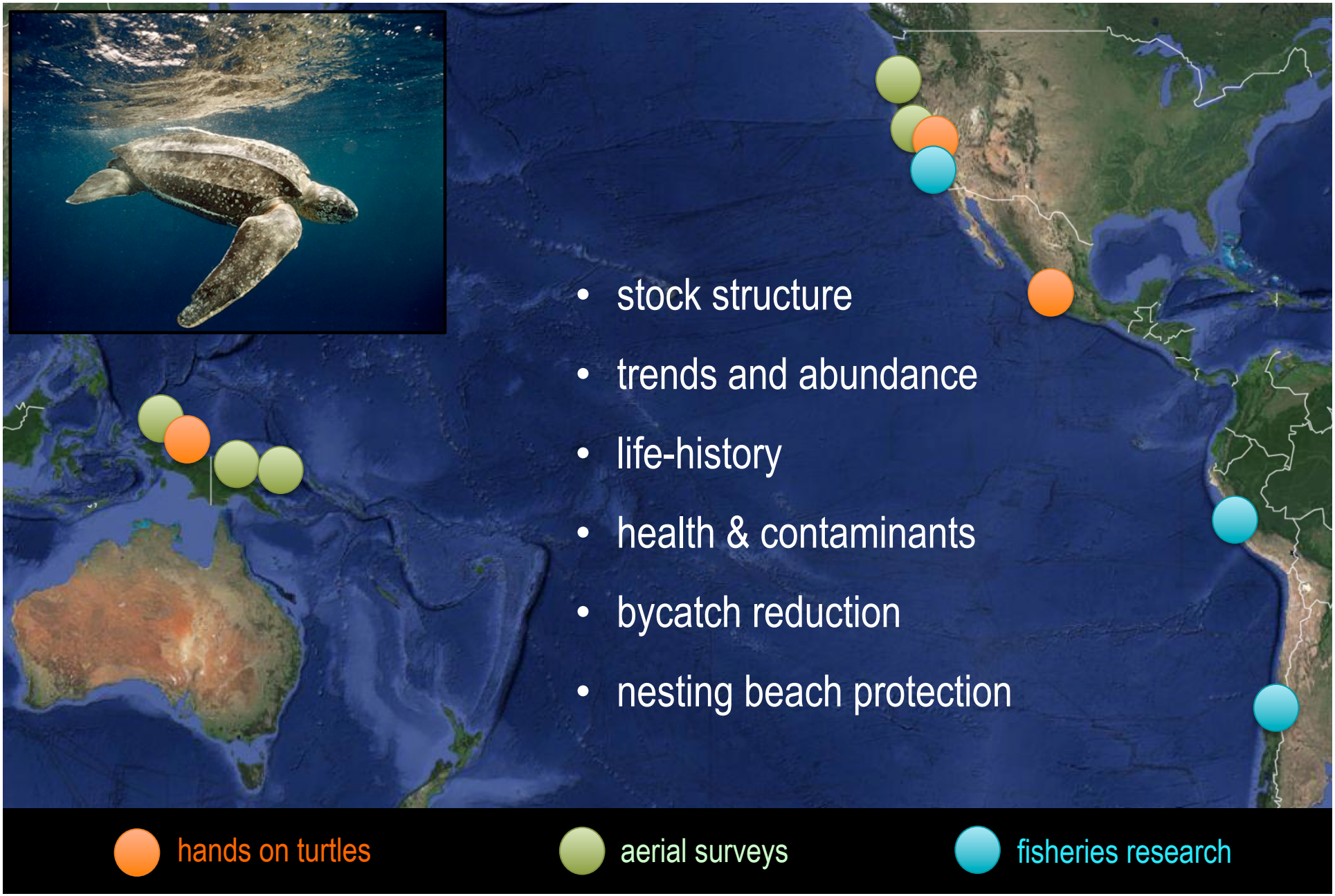
HOLISTIC APPROACH



Data gathering relies on domestic and international partnerships

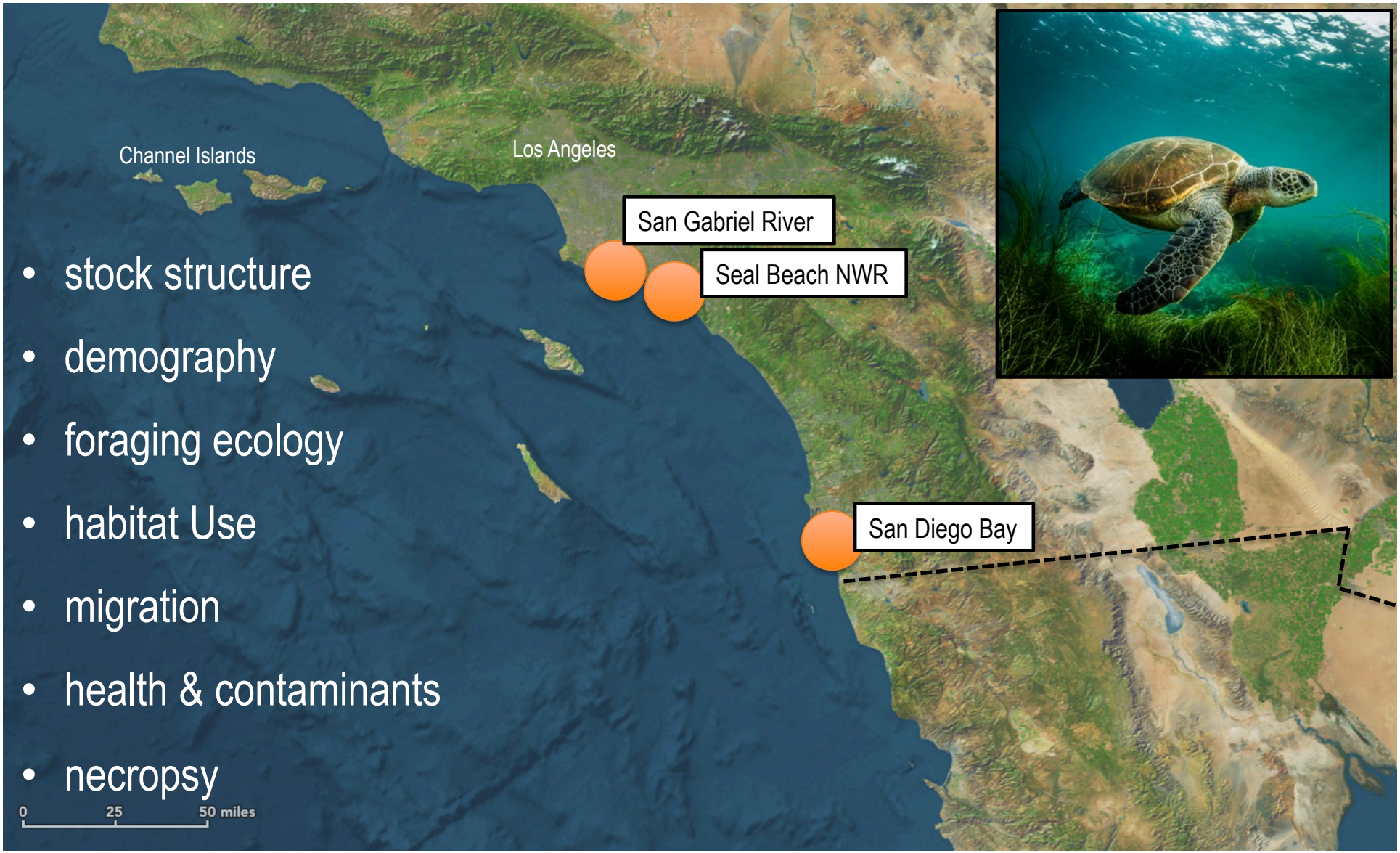


Working towards leatherback recovery across the Pacific

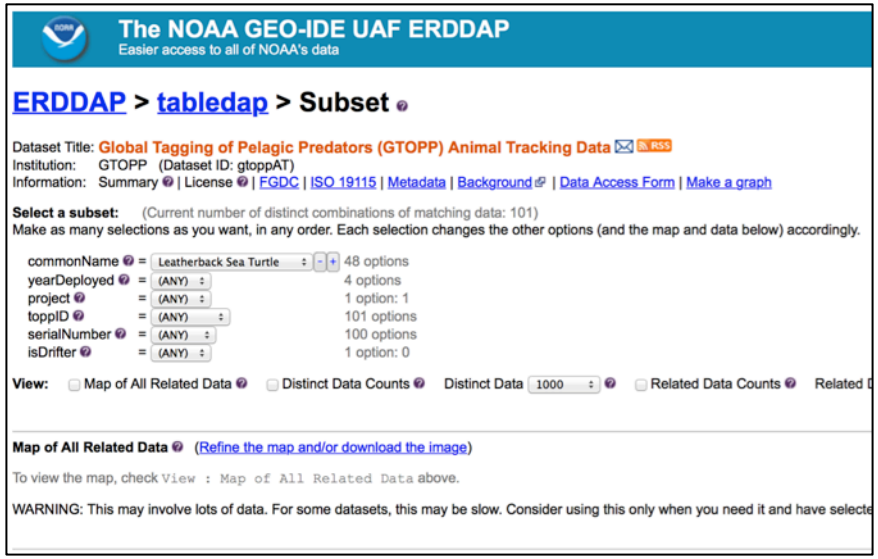


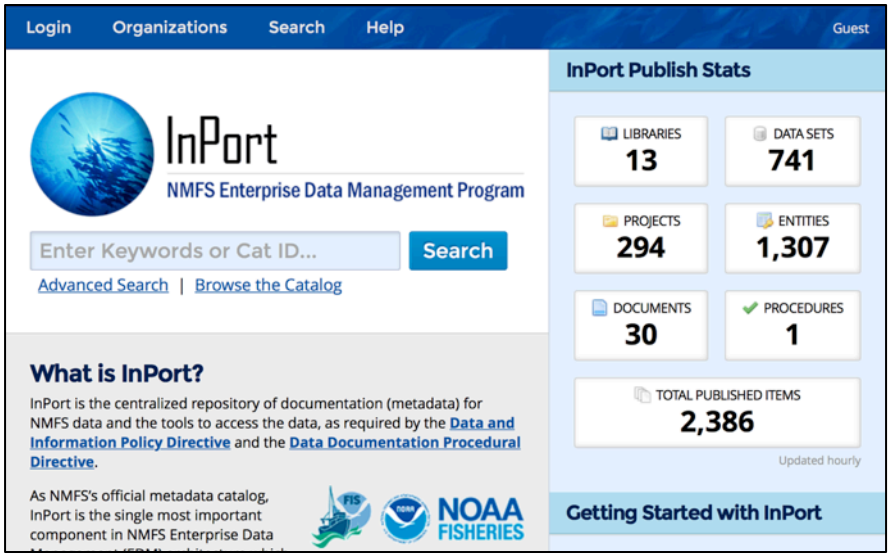
Crossing borders: studying loggerheads in the California Current

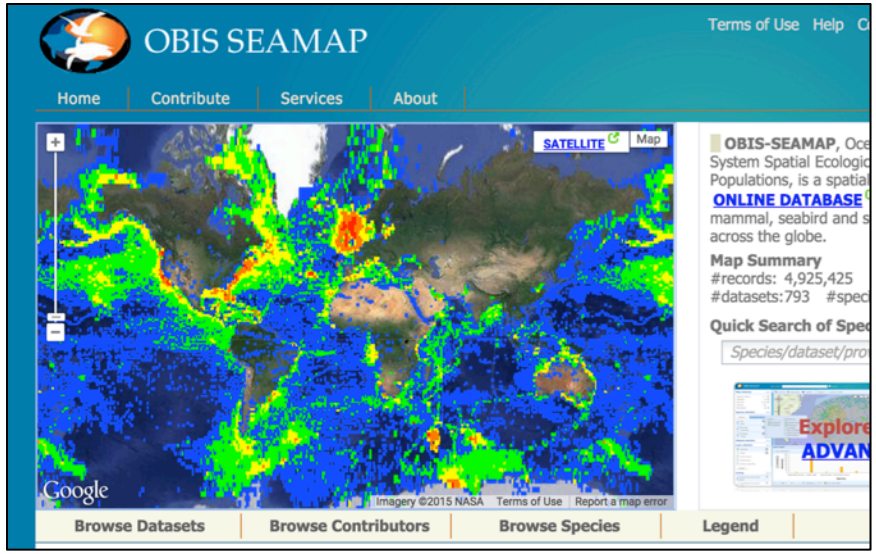
Comprehensive, collaborative research on green turtles in Southern CA



Making our data available to the public







Bycatch reduction activities

- Gear trials and mortality surveys (Chile, Mexico, Peru)
- Bycatch evaluation for Pacific leatherbacks (US, ocean basin)
- Bycatch avoidance tools (TurtleWatch 2.0)
- Comparability analyses for MSRA management

MSRA support

NOAA Technical Report

COMPARABILITY EVALUATION FOR UNITED STATES AND MEXICO FISHERIES THAT INTERACT WITH NORTH PACIFIC LOGGERHEAD SEA TURTLES

Loggerhead Turtle MSRA Technical Advisory Team*

*Team Members:

Tomo Eguchi, NMFS-Southwest Fisheries Science Center, La Jolla, CA
Tina Fahy, NMFS-West Coast Regional Office, Long Beach, CA
Irene Kelly, NMFS-Pacific Islands Regional Office, Honolulu, HI
Jeffrey Seminoff (Chair), NMFS-Southwest Fisheries Science Center, La Jolla, CA
Yonat Swimmer, NMFS-Pacific Islands Fisheries Science Center, Honolulu, HI
John Wang, NMFS-Pacific Islands Fisheries Science Center, Honolulu, HI

U. S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
NOAA Technical Report NMFS

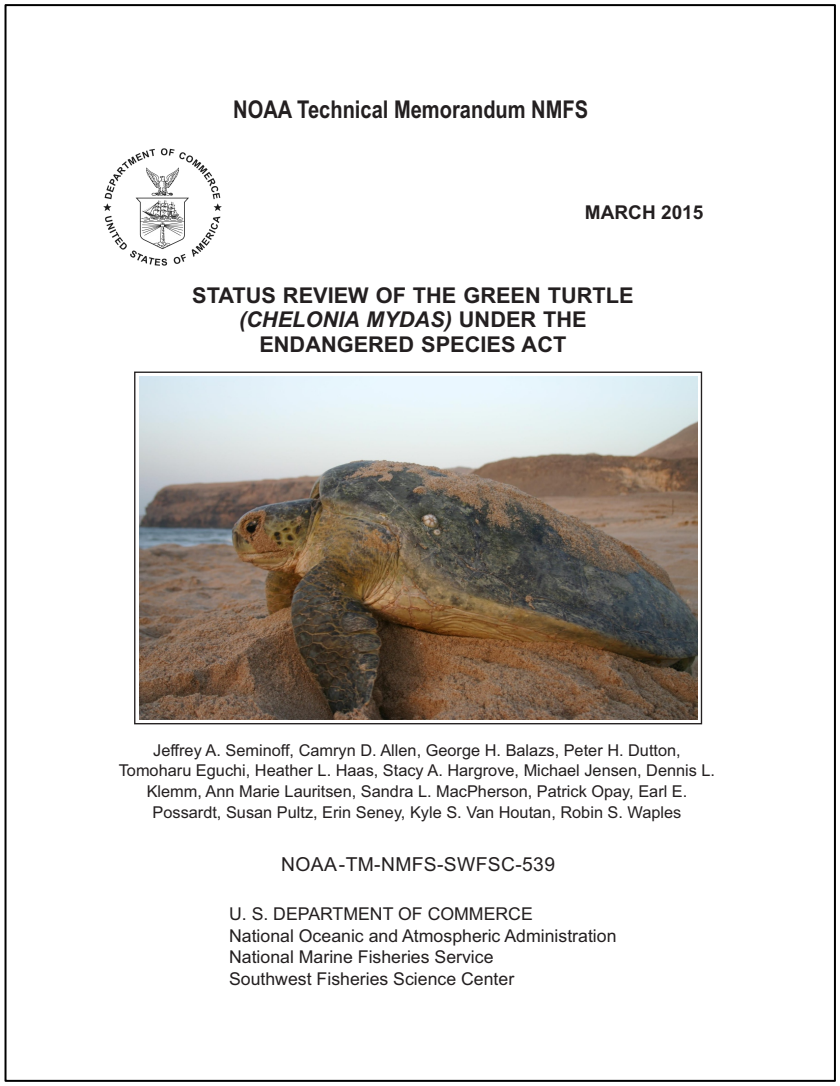
27 MAY 2015

- *North Pacific loggerheads*
- Baja, Mexico fisheries
- comparability evaluation
- support MSRA certification decisions

Status Assessments

- ESA Status Reviews
- ESA Critical Habitat designations
- IAC Signatory National Assessments
- IUCN Red List Assessments

ESA Status Reviews



NOAA Technical Memorandum NMFS

MARCH 2015

STATUS REVIEW OF THE GREEN TURTLE
(CHELONIA MYDAS) UNDER THE
ENDANGERED SPECIES ACT

Jeffrey A. Seminoff, Camryn D. Allen, George H. Balazs, Peter H. Dutton, Tomoharu Eguchi, Heather L. Haas, Stacy A. Hargrove, Michael Jensen, Dennis L. Klemm, Ann Marie Lauritsen, Sandra L. MacPherson, Patrick Opay, Earl E. Possardt, Susan Pultz, Erin Seney, Kyle S. Van Houtan, Robin S. Waples

NOAA-TM-NMFS-SWFSC-539

U. S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southwest Fisheries Science Center

- *Green turtle review most recent*
- 5 SWFSC scientists on team
- DPS designation
- Abundance and trends
- Quasi-extinction risk
- 5-factor analysis

Other MTEAP activities

whale disentanglement

oil spill response

Other MTEAP activities

science outreach

training

Strengths

- Our people – committed, experts in field, high performers, good collaborators
    - *Aerial survey line-transect analysis*
    - *Mark-recapture analysis*
    - *Nesting beach monitoring*
    - *Assessment science and modeling*
- Holistic approach to research and recovery planning
- International leaders with many collaborations worldwide
- NMFS' go-to lab for science advice about marine turtles
- Emphasis on science mentoring and capacity building

Challenges

Process and Infrastructure

- Maintaining continuity with scientific and technical personnel
- High cost and limited access for research platforms (boats, NOAA aircraft)
- Data management and reporting

Science

- Staying relevant / at forefront as data providers and capacity builders
- Maintaining national & international collaborations / attending meetings
- Maintaining long-term time-series data for sea turtles in the E. Pacific
- Understanding consistency in loggerhead abundance in SoCA bight
- Greater assistance to HQ activities = less time for empirical data production

Strategies

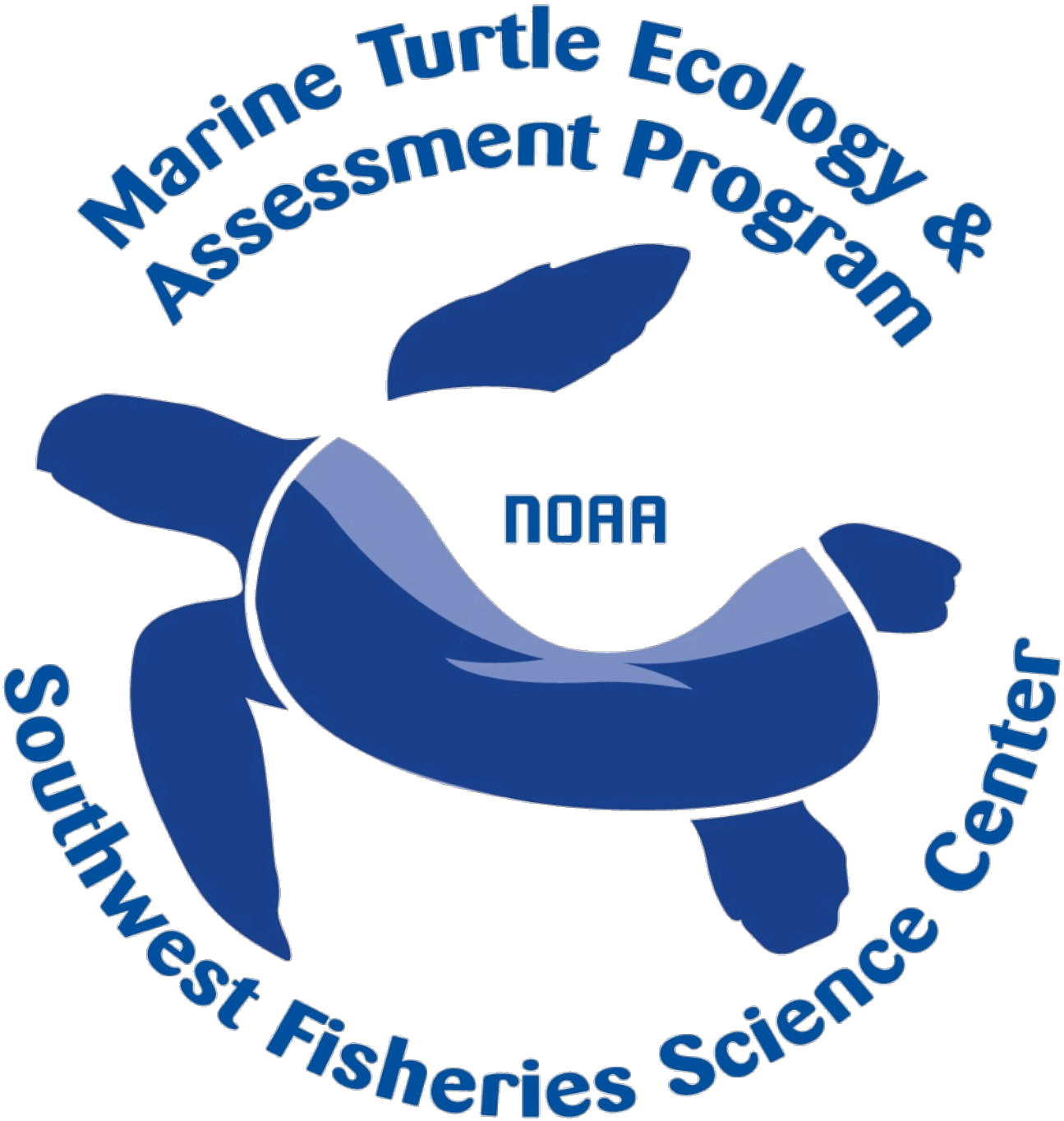
- Medium- and long-term planning of survey needs
- Modify research priorities to meet management requirements
- Foster partnerships in & outside of SWFSC
- Be active with internal and external proposal writing
- Involve graduate students and post-docs in our research
- Human resources: committed to backfilling turtle data manager position
- Workplace: acknowledge and reward excellence; offer training opportunities; promote safety in the field

Today's case studies

Leatherback beach monitoring and capacity building
Manjula Tiwari

Aerial and at-sea surveys of leatherbacks
Scott Benson

Aerial and at-sea surveys of loggerheads, green turtles
Tomo Eguchi


Marine Turtle Ecology &
Assessment Program
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Southwest Fisheries Science Center